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Devices for dispensing and counting articles.

A device for dispensing articles comprises a container for receiving the container comprising a storage region for articles, dispensing means operable to dispense an article from the storage region, operation of the dispensing means being arranged to move an article from a holding position to a desired orientation, means (50) responsive to operation of the dispensing means for counting the number of operations, the counting means (50) being operable only when an article is dispensed, and means for releasing removal of the container from the housing until all the articles have been dispensed.

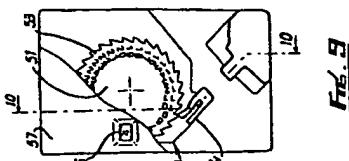


Fig. 1, see 844/040, 720/1 P/002

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membrane from the outlet. The cut membrane may be pushed into a recess in the container. The outlet may have four sides and the membrane extends beyond the sides of the outlet and the means cuts the membrane along and outside three sides and pushes the membrane along and outside the fourth side to move the cut membrane into the recess.

A device according to the invention may have one or more of these features.

The invention may be performed in various ways and one specific embodiment with possible modifications will now be described by way of example with reference to the accompanying schematic drawings, in which:

- Fig. 1 is a perspective view of a first embodiment of an article dispensing device;
- Fig. 2 to 4 are part sections through this embodiment showing dispensing of an article;
- Fig. 5 is a section on the line 5-5 of Fig. 1;
- Fig. 6 is a section on the line 6-6 of Fig. 1;
- Fig. 7 is a section on the line 7-7 of Fig. 1;
- Fig. 8 is a section on the line 8-8 of Fig. 1;
- Fig. 9 is a section on the line 9-9 of Fig. 1;
- Fig. 10 is a section on the line 10-10 of Fig. 1;
- Fig. 11 to 13 are sections showing operation of an unjamming mechanism;
- Fig. 14 A to C show insertion of a hopper;
- Fig. 15 is a perspective view showing insertion of a hopper;
- Fig. 16 is an enlarged view of part of Fig. 15;
- Fig. 17, 18 show interaction between hopper and counter mechanism;
- Fig. 19 A to D show another form of interaction between hopper and counter mechanism;
- Fig. 20 A to D show another form of interaction between hopper and counter mechanism;
- Fig. 21 is a perspective illustration of hopper and cutter;
- Fig. 22 A to 22 D show operation of a full cutter;
- Fig. 23 is a perspective view of a device with lock and show operation of the lock;
- Fig. 24 A to C is a perspective view of a second embodiment;
- Fig. 25 to 31 D are part sections showing the dispensing components of the second embodiment;
- Fig. 32 is a section through line 32-32 of Fig. 31A;
- Fig. 33 is a part-section showing a counter mechanism;
- Fig. 34 is a section through line 34-34 of Fig. 33;
- Fig. 35 to 37 are sections showing operation of the unjamming mechanism;
- Fig. 38 A to D shows details of the hopper-releaser interaction between the hopper and counter wheel;
- Fig. 39 to 40 show details of a trigger lock.

In general a dispensing device for articles is arranged for use for example for the elderly, infirm or handicapped and is arranged on each operation to dispense a single article. A counter may be arranged to indicate the number of articles dispensed or not yet dispensed. A replaceable hopper can be used to load the device. The device includes a store in which the articles are confined to a single phase, the store having an outlet passage shaped to receive articles in a desired orientation. When operated the article to be dispensed is moved from a holding or waiting position in a dispensing position.

In a first embodiment the device 30 for dispensing articles, for example pills, tablets or capsules or other solid medicaments, comprises a housing 31 including a dispensing mechanism 32 and a hopper 33 for one or introducing into the device articles which are to be dispensed. As shown in Fig. 1, the device 30 is sized to be held in a hand. It includes a dispensing element 34 rotatably mounted in the housing 31 and a zone 35 into which an article 36 is dispensed.

Inside the housing 31 is a storage region 37 which receives the hopper 33. A dispensing outlet passage 38 leads from a lower end of the region 37 which, as shown in Fig. 2, is defined by walls 39, 39a which are inclined towards the passage 38. The region 37 has parallel walls 40, 41 spaced so as to confine the stored articles 36 to a single phase.

The dispensing element 34 includes an operating part 42 which in a datum position is located at a corner of the housing 31. In this position the next article 36a to be dispensed is located in a gap 43 between two portions 43a, 44 of the dispensing element 34 and is engaged with a part 48 of the housing 31. When the user presses the operating part 42 against a suitable surface so as to move the element 34 upwards in the housing (Fig. 3, 4) the article 36a is moved laterally so that the article 36a can fall into the zone 35, during which movement a part 47 of the element 34 moves into a position during the lower end of the passage 38 (Fig. 4). The element 34 includes an offset portion 49 at one side of the gap 43 and connecting the portions

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This invention relates to devices for dispensing articles.

According to one aspect of the invention a device for dispensing articles comprises a store for articles, and dispensing means operable to dispense an article from the store, operation of the dispensing means being arranged to move an article from a holding position to a desired orientation.

The dispensing means may comprise first and second parts between which the article is received in the holding position, movement of the first and second parts moving the article to the dispensing position.

There may be a lost motion connection between the first and second parts so that dispensing movement of the first part only moves the second part when an article is in the holding position. There may be means for discharging articles in the store. The discharging means may be operated by the dispensing means.

There may be a connection between the dispensing means and the dispensing means arranged to operate the dispensing means on operation of the dispensing means to dispense an article and on movement of the dispensing means to a position to receive the next article to be dispensed. The connection may comprise a rack and a toothed wheel.

The store may comprise a storage region with an outlet passage leading to the holding position and arranged to receive articles in a desired orientation. The dispensing means may comprise rotary means having elements extending into the store. The rotary means may have elements extending into the store which are adjacent an inlet to the outlet passage. The store region may comprise walls inclined towards the inlet, and the elements move in the store region adjacent the walls.

The device may have a housing having a peripheral defining corner, and the dispensing means comprise an operating member at a corner. There may be security means movable between an operative position in which operation of the dispensing means is released to an operative position in which operation of the dispensing means is prevented.

There may be means for releasably holding the security means in the operative position. There may be means for releasably holding the security means in the operative position. The device may comprise a housing, the security means comprising a member movably supported in the housing and may be sized to be hand-held.

According to another aspect of the invention a device for dispensing articles comprises a store for articles, means operable to dispense an article from the store, and means responsive to operation of the dispensing means for counting the number of operations, the counting means being operable only when an article is dispensed. Operation of the dispensing means may move an article from a holding position to a dispensing position.

The dispensing means may comprise first and second parts between which an article to be dispensed is received in the holding position, and a lost motion connection between the first and second parts so that the second part moves with the first part only when an article is received between the first and second parts, the counting means being responsive to movement of the second part.

According to another aspect of the invention a device for dispensing articles comprises a container for articles, a housing for receiving the container, means associated with the housing and operable to dispense an article, and means for releasing removal of the container from the housing until all the articles have been dispensed. There may be means for releasing removal of the container from the housing until all the articles have been dispensed. There may be means for releasing removal of the container from the housing until all the articles have been dispensed.

The first container formation may be movable between an operative position in which the first container formation can cooperate with the first housing formation and an inoperative position, the first container formation being moved to the inoperative position by said engagement of the first formations. The first container formation may be carried by bistable means so as to be movable between the operative and inoperative positions. There may be eject means operable to eject the container from the housing when the releasing means is rendered ineffective on dispensing of all the articles. The eject means may comprise spring means energised by receipt of the container by the housing.

According to a further aspect of the invention a device for dispensing articles comprises a container for articles, a housing for receiving the container, means associated with the housing and operable to dispense an article, the container having an outlet, a closure for the outlet, the housing and container having cooperative means which open the outlet on receipt of the container by the housing. The closure may be a flexible membrane connected to a member, which member on insertion of the container into the housing engages with the housing to draw the membrane from the outlet. The closure may be a flexible mechanism, and the housing comprises means operable on insertion of the container into the housing to cut the membrane and to move the cut

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43, 44.

The element 34 is biased to the datum position by a spring 120 (not shown from some figures) which when the element 34 is no longer pressed upwards urges the element back to the datum position and the article 36b at the lower end of passage 38 moves into the gap 43 so as to be ready for dispensing on the next operation of part 42.

It is desirable to include in the device 30 a counter or indicator mechanism 50 to provide an indication of how many articles have been dispensed from an initial number in the storage region 37 or how many remain in the region 37. For this purpose, a wheel 51 is mounted in the housing 31 for rotation on axle 52 and has a number of peripheral teeth 53 co-operable with an element 54 connected to portion 43 and slidably guided in the housing 31 so that on each upward movement of the part 42 the wheel 51 is turned one tooth. A window 55 in a wall 57 of the housing 31 displays either the number of articles dispensed or the number remaining in region 37. The number of teeth 53 corresponds to the number of articles initially in the region 37.

If the part 42 is operated when the region 37 is empty of articles, it is undesirable for the counter mechanism to be operated. A lost motion connection is therefore provided between portions 43, 44. The portion 44 is pivoted and element 34 includes a recess 58 in which is slidable tongue 59 extending from portion 43 and including lip 59a. In the datum position the lip 59a is at the upper end of the recess 58 and if an article 36a is in the gap 43 dispensing occurs because the article 36a establishes a connection between portions 43, 44. If the gap 43 is empty then on upward movement of the part 42 and portion 44, the portion 43 does not move upwards.

One reason why gap 43 may be empty is if the article 36a in the lower part of region 37 are tilted or jammed so as not to pass in succession into the passage 32, as an example is shown in Fig. 12. An article displacing mechanism 60 is provided in the housing 31 and includes two wheels 61, 62 rotatably mounted in the housing 31. The wheels 61, 62 have co-operable toothed peripheral portions 61a, 62a. Wheel 62 has a coiled toothed cog 63 which co-operates with a toothed rack 64 on an extension 65 of the part 42 which is slidably guided on housing 31.

The wheels 61, 62 carry a plurality of equidistantly spaced pins 66, in the case shown three, extending parallel to the axis of rotation adjacent the wheel peripheries. On operation of part 42 the wheels 61, 62 are rotated in opposite senses and one or more pins 66 are moved in the storage region 37 laterally of surfaces 39, 39a to disturb the articles 36 (Fig. 13) and allow an article 36a to move into the gap 43. The rack 64 and cog 63 have a wavy ratchet connection so that the cog 63 is turned only on upward movement of rack 64.

Other means for article disturbance could be provided. The hopper 33 is pushed fully into the housing 31 as that after insertion the hopper 33 cannot readily be tampered with, and the hopper is constructed so that tampering before insertion can be detected. Thus the flat hopper has opposed walls 67, 68 which slidably engage housing walls 69, 70, a top wall 69 and side walls 70, 71. Wall 71 is inclined towards wall 70 at corner part 71a so as to direct the articles towards an outlet 72.

The outlet 72, before the hopper is inserted into the housing 31, is closed by a pivotally cap 73 which extends partially along wall 70 and is attached to a base 74. When the hopper is pushed into the top of the housing 31, the base 74 locates in a recess 75 adjacent the housing top and further movement of the hopper causes the cap 73 to pass away from the outlet 72, see Figs. 14 A-C, allowing articles to move from the hopper into the lower end of region 37, the hopper occupying the upper end.

Preferably the lower face 40a of housing wall 40 has a keyway 17 co-operable with a boss 78 on wall 70. If the boss 78 is not in the correct position the hopper cannot be inserted into the housing. After the hopper 31 may have a non-releasable tongue 79 which when pressed can eject a tongue 80 in the lower face 40a. Means are provided to eject or part eject the hopper 33 from the housing 31 when all the articles have been dispensed. As mentioned, the number of teeth on the counter mechanism wheel 51 would correspond to the number of articles in the hopper before insertion into the housing. The boss 78 on insertion of the hopper passes through a gap 81 (Fig. 17) in a ring 82 attached to the counter wheel 51. A plunger 83 extends on movable arms 84 engages a boss 85 on a ring 82 and the ring 82 rotates in a position (Fig. 18) to block upward movement of the hopper which thus cannot be removed and the complete number of articles has been dispensed and the gap 81 (Fig. 17) is again above the boss 78. Each arm 84 has a flexible part 84a and can rotate at an end and is supported 84b and is constructed to operate as an one-counter mechanism with upper (Fig. 12) and lower (Figs. 13, 17) state positions. Insertion of the hopper causes arms 84 to operate as an open or to its stable state under the engagement of parts 82, 83.

A spring 88 engages between the hopper and the housing and is compressed by insertion of the hopper so that when the gap 81 is again above the boss 78 the spring 88 moves the empty hopper upwards, the boss 78 passing through the gap 81. A further hopper identification key 91 on an arm 84 may co-operate with a keyway 92 in lower face 40a. Because the arms 84 are now in the upper 81-state position, if the hopper were re-inserted into the housing the plunger 83 would not engage the boss 85 and the spring 88 would again eject the empty hopper.

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to a modified arrangement, Figs. 19A-D, a structure 87 is attached to the hopper and includes U-shaped element 87a having arms 88, 89. Arm 88 can be bent at junction 90 between arms 88, 89. When the hopper is inserted into the housing, arm 88 moves slightly towards arm 89 and they pass through gap 91 and arm 88 then moves away from arm 89 (Fig. 19B) so that the hopper cannot be removed because of engagement with the ring 82. As the ring is rotated stop by stop during use, a pin 93 moves arm 88 fully against arm 89 and they are held in this position by a catch 94 in that (Fig. 19C) when the gap 91 returns to the initial position the arms 88, 89 can pass through the gap 91 without the spring 86 ejecting the hopper. If the hopper is re-inserted it will again be ejected. The arms 88, 89 form a structure with two stable positions (Fig. 19A, Fig. 19C).

In the arrangement of Figs. 20A-D the hopper 33 has an aperture 98 in which a projecting latch 99 can slide. When the hopper is inserted the latch 99 at one end of the aperture engages a shoulder 97 at one end of a cam surface 96 on the ring 82 to move the ring 82 to a hopper-releasing position (Fig. 20D). As the wheel 84 is rotated in use, the latch 99 engages the cam surface 96 and is moved to the other end of the aperture 98 where it disengages 30 is empty, at which stage the spring 86 ejects the hopper. If the empty hopper is reinserted the latch 99 does not engage shoulder 97 and the hopper is again ejected. The latch 99 thus has two operating positions at the ends of the aperture.

Figs. 21, 22A-D show another means for opening a hopper with its outlet face closed by a sealed metal ball 100. The outlet of the hopper is formed by walls 101 surrounded by a channel 102. Mounted in the housing is a generally rectangular device 103 open at its ends and having walls 104, 105, 106, 107. The upper edges of walls 104, 105, 106 are formed so as to cut the ball as the hopper is inserted.

The edge of wall 107 is convex and this pushes the ball which has been cut on three sides into one side of the channel (Fig. 22D). When the hopper has been inserted, the walls 104-107 are in the channel 102. Preferably the device 30 is provided with a measure of resistance to uncontrolled use, or child proofing.

As shown in Fig. 23, one side of the housing 31 is provided with a trigger-like portion 110 pivoted at one end 111 and grippable during use. A removable locking member 112 is slidably mounted to project through an aperture 113 in wall 40. The member 112 is provided with a tab 114 which prevents movement of the member 112 in the aperture 113. A latch shown schematically at 115 connects the trigger 110 and the part 42 so that if the trigger 110 is in the down, unsequenced condition the part 42 cannot be operated to dispense an article. If the tab 114 is removed by pulling off, the member 112 can move in the aperture 113. The trigger is provided with two spaced notches 116, 117.

With the tab 114 removed and the member 112 at the lower end of aperture 113, the trigger 110 can be squeezed to release the latch 115 and the part 42 can be operated (Fig. 24A). The requirement to squeeze the trigger 110 provides a degree of child proofing.

If the trigger 110 is in the unsequenced state and the member 112 is moved into notch 116 (Fig. 24B), the part 42 cannot be operated. If the trigger is squeezed and the member 112 is moved into notch 117 to hold the trigger in sequenced condition (Fig. 24C), the part 42 can be operated and the child proofing is removed; this would be for users who through age or infirmity are unable to, or unable reliably to, squeeze the trigger 110. It will be noted that the operating part 42 is at a corner of the housing 31, so that the housing 31 can be rotated on any side without operating the part 42.

The slidable parts are guided by walls in the housing some of which are omitted for clarity.

The zone 35 may have transparent walls so that a dispensed article can be seen, and have one or more apertures 36a (Fig. 1) through which the dispensed article can be removed through an aperture 36a by manipulating the device 30, for example the article can fall onto a plate or pass direct into a user's mouth.

If desired the article rest zone 35 could be omitted and the article fall direct from the device 30. The position of key and keyway 78, 77 is different for different hoppers so that each housing will cooperate only with hoppers with the correct key 78. Hoppers with different keys 78 are loaded with different articles 36. A user with a particular housing 31 can only receive articles appropriate to a housing having the relevant key 78.

There could be a spring to assist in dispensing the article 36a (Fig. 4).

A second embodiment is illustrated in Figs. 25-40. Components having functions similar to those of the first embodiment retain the same label number.

A device 30 comprises a housing 31 including a dispensing mechanism 32 and a hopper 33 for use in introducing into the device articles which are to be dispensed. In this embodiment, the dispensing zone 35 is located within the housing 31 in a storage region 37 which receives the hopper 33, so in the first embodiment. A dispensing outlet passage 38 leads from a lower end of the region 37 which, as seen in Fig. 26, is flanked by walls 39, the walls which are inclined towards the passage 38. The region 37 has parallel walls 40, 41 spaced so as to confine the stored articles 36 in a single plane.

The dispensing element 34 is located at the base of the housing, Fig. 25. When the user presses the device

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downwardly on a surface this element 34 retracts into the housing. A shuttle 123 located in a channel in one wall of the housing is moved to the position shown in Fig. 29 by shuttle driver 124, having a follower 125 which runs in a groove 126 in an upstanding wall 83 of element 34 (see Figs. 31A-D) and 32. Article 36a drops into position in the gap 43 between shuttle 123 and a true shuttle 122, which is urged to its position in Fig. 29 by a light spring (not shown), when the device is released, element 34 is returned to its starting position by means of a spring (not shown).

The shuttle driver 124 returns shuttle 123 to its starting position (Fig. 29). If the article 36a has successfully fallen to its position in Fig. 27, the article is urged into contact with the true shuttle 122 and moved laterally to the delivery position in Fig. 28. A final slight retraction of shuttle 123 caused by the cranked top end of groove 126 allows the article to drop through the dispensing zone into the dispensing element 34, from which it can be tipped into the user's hand or mouth, or into another receptacle.

If article 36a became trapped in the position shown in Fig. 29b, then spring 120 would compress and prevent damage to the trapped article.

The counting mechanism in this embodiment is shown in Fig. 33. Element 54 has a hole 76 which engages a peg on the back of true shuttle 122, this peg projecting through a slot in the housing wall. When the device is operated and an article 36a is successfully delivered, the element 54 is moved to the right (Fig. 33), and a ratchet arm on element 54 engages ratchet teeth 53 on counter wheel 51. Wheel teeth 52 comprise a ratchet mechanism to prevent reversal of counter wheel 51 when the device is next operated and element 54 is moved to the left. If no article 36 is dispensed, either because no article falls into place or because of jamming, then shuttle 122 does not move and the counter wheel is not advanced. The number of articles dispensed is viewed through a window 58 in housing 37.

The means to prevent breaking or jamming in this embodiment is shown in Figs. 35-37. The upstanding wall of element 34 terminates in two parallel walls 64 having ratchet teeth. These co-operate with locked wheels 63 which extend through the wall of the housing to drive wheels 61, 62 having blades 66 which are actuated in the directions indicated when the device is activated, displacing the articles in a generally upward direction. Reversal of rotation is prevented by fingers 67 (Fig. 35) provided in the housing wall. The blades are set in shallow wells in one wall of the housing, the geometry being such that it is impossible to trap an article between a blade and the side of the housing.

In this embodiment, rotation of the hopper is effected as shown in Figs. 38A-D. When hopper 33 is inserted into the housing base 79 passes through gap 81. A bi-stably mounted peg 88 mounted within the formation 121 on the hopper engages shoulder 87 of the counter wheel 51 to rotate it so that base 79 is trapped within ring 82. As counter wheel 51 is rotated in use, peg 88 is moved by cam surfaces 89 to its second stable position. The hopper is ejected by a spring when counter wheel 51 has completed its rotation and base 79 is again aligned with gap 81. On re-insertion of the hopper with peg 88 in this second position, no contact with shoulder 87 would occur, and counter wheel 51 would not be rotated into the position where base 79 is trapped. The hopper would therefore be immediately ejected.

As in the first embodiment, the trigger device 110 (Fig. 35) must be depressed before the dispensing mechanism can be activated. In this embodiment, the locking mechanism comprises a slidable locking member 112 (Fig. 39) which can engage notch 116 to prevent activation and provide a degree of child-proofing (Fig. 40b). For someone finding a gripping motion difficult, the trigger can alternatively be locked into its operating position by engaging member 112 with notch 117, as in Fig. 40c.

Claims

1. A device for dispensing articles comprising:
 - a) a container for articles,
 - b) a housing for receiving the container comprising a storage region for articles,
 - c) dispensing means operable to dispense an article from the storage region, operation of the dispensing means being arranged to move an article from a holding position to a dispensing position,
 - d) means responsive to operation of the dispensing means for counting the number of operations, the counting means being operable only when an article is dispensed, and
 - e) means for restricting removal of the container from the housing until all the articles have been dispensed.
2. A device as claimed in Claim 1, in which the dispensing means comprises first and second parts between which the article is received in the holding position, movement of the first and second parts moving the article to the dispensing position, and including a lock motion connection between the first and second

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parts so that dispensing movement of the first part only moves the second part when an article is in the holding position.

3. A device as claimed in Claim 1, in which the storage region has an outlet passage leading to the holding position, the outlet passage being arranged to receive articles in a desired orientation.

4. A device as claimed in Claim 1, comprising means operable by operation of the dispensing means for disturbing articles in the storage region, the disturbing means comprising rotary means having elements extending into the storage region adjacent an inlet to the outlet passage.

5. A device as claimed in Claim 1, including security means movable between an inoperative position in which operation of the dispensing means is restricted to an operative position in which operation of the dispensing means is permitted.

6. A device as claimed in Claim 5, including means for releasably holding the security means in the inoperative position or in the operative position.

7. A device as claimed in Claim 1, in which the dispensing means comprises first and second parts between which an article is to be dispensed is received in the holding position, and a lock motion connection between the first and second parts so that the second part moves with the first part only when an article is received between the first and second parts, the counting means being responsive to movement of the second part.

8. A device as claimed in Claim 1, in which the means for restricting removal comprises co-operable means of the housing and container responsive to receipt of the container by the housing, wherein first and second formations on the container co-operate respectively with first and second formations in the housing, engagement of the first formations on receipt of the container moving the second housing formation to co-operate with the second container formation to restrict removal of the container, operation of the dispensing means to dispense all the articles moving the second housing formation out of cooperation with the second container formation.

9. A device as claimed in Claim 8, in which the first container formation is carried by bi-stable means so as to be movable between an operative position in which the first container formation can co-operate with the first housing formation and an inoperative position, the first container formation being moved to the inoperative position prior to removal of the container from the housing.

10. A device as claimed in Claim 8 comprising eject means operable to eject the container from the housing when the restricting means is rendered ineffective on dispensing of all the articles.

11. A device as claimed in Claim 8, in which the eject means comprises spring means energized by receipt of the container by the housing.

12. A device as claimed in Claim 1 wherein the container for articles has an outlet, a closure for the outlet, the housing and container having co-operable means which open the outlet on receipt of the container by the housing.

13. A device as claimed in Claim 12 in which the closure is a flexible membrane, and the housing comprises means operable on insertion of the container into the housing to cut the membrane and to move the cut membrane from the outlet, the cut membrane being pushed into a recess in the container.

14. A device as claimed in Claim 13, in which the outlet has four sides and the membrane extends beyond the sides of the outlet and the means cuts the membrane along and outside three sides and pushes the membrane along and outside the fourth side to move the cut membrane into the recess.

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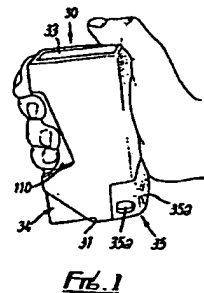


FIG. 1

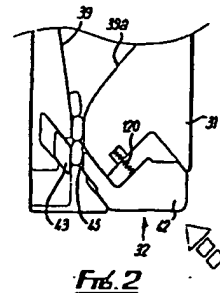


FIG. 2

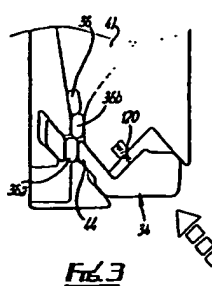


FIG. 3

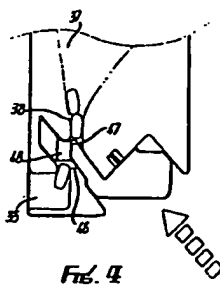
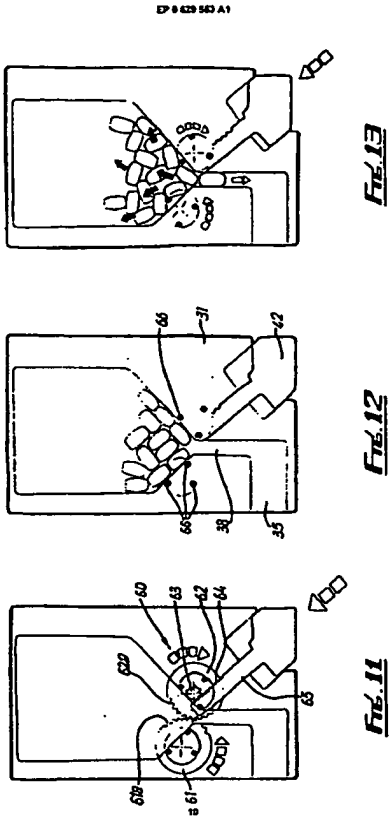
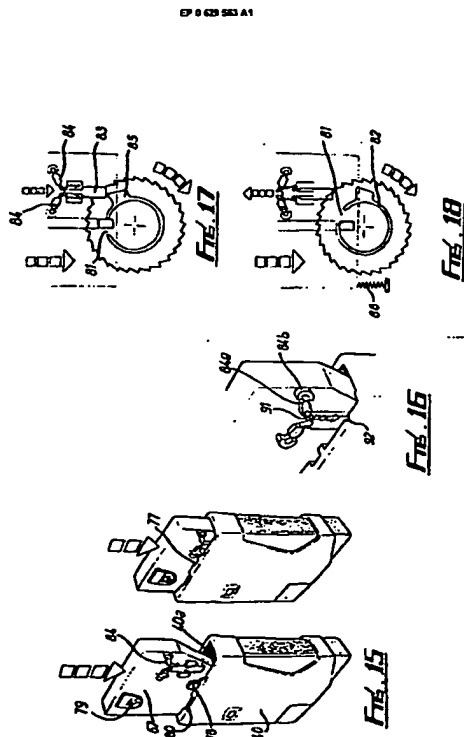
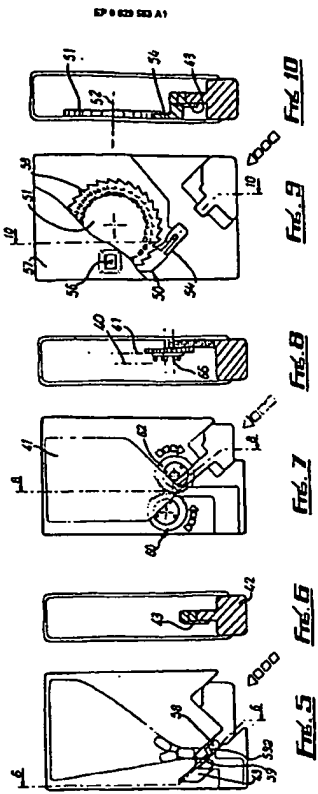
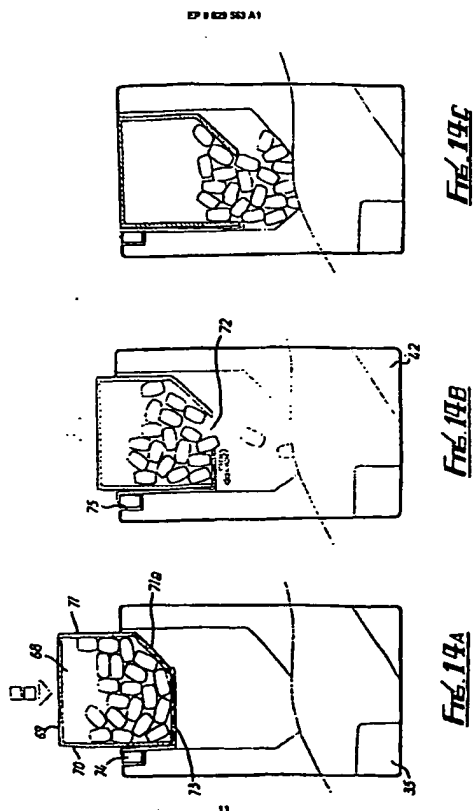


FIG. 4



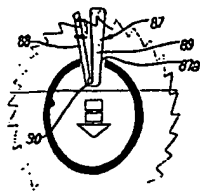


Fig. 19A

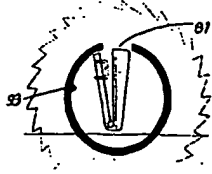


Fig. 19B

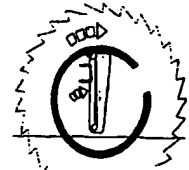


Fig. 19C

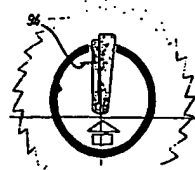


Fig. 19D

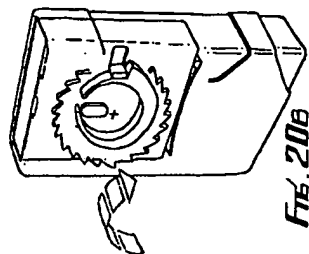


Fig. 20B

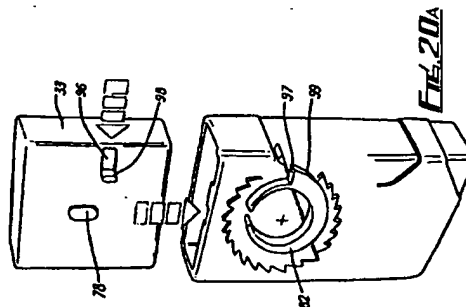


Fig. 20A

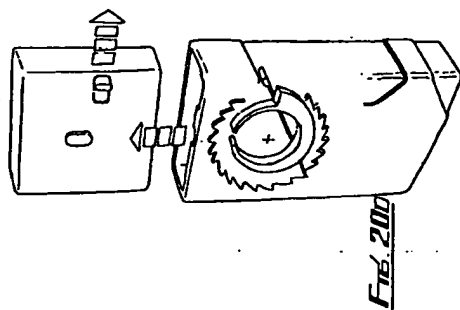


Fig. 20C

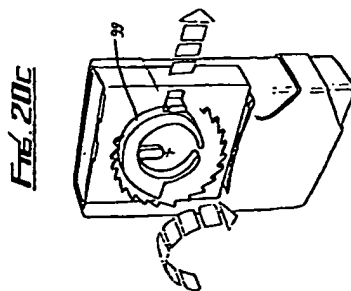


Fig. 20D

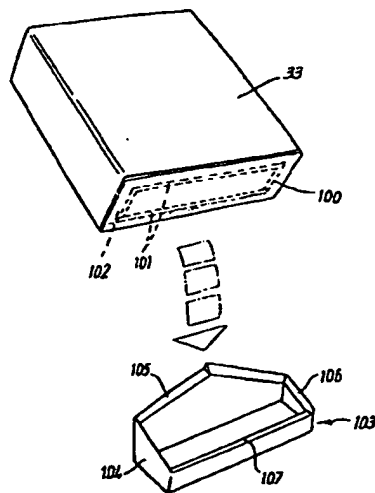
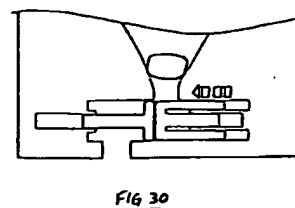
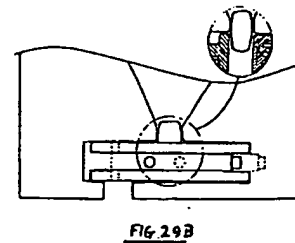
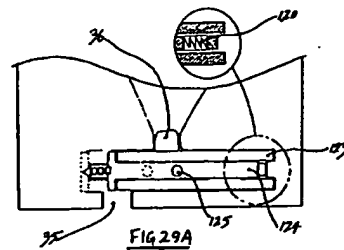
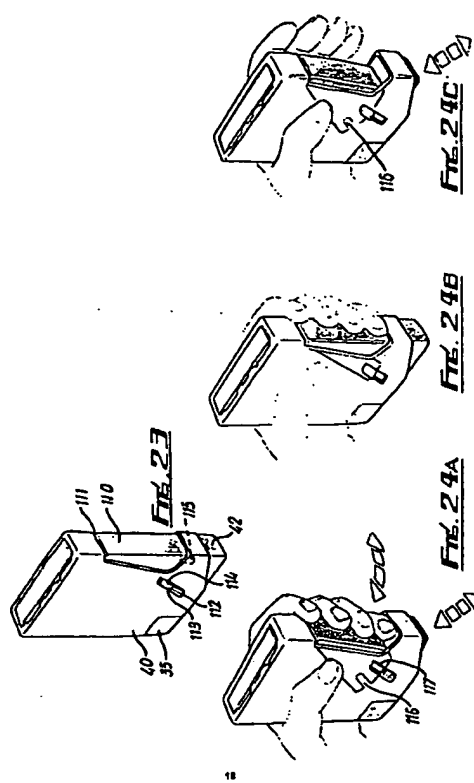
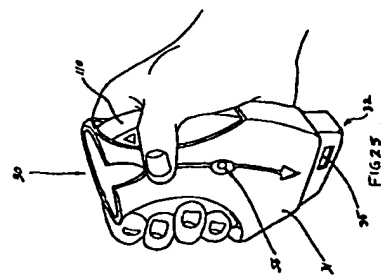
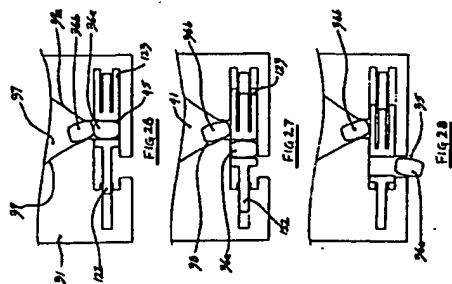
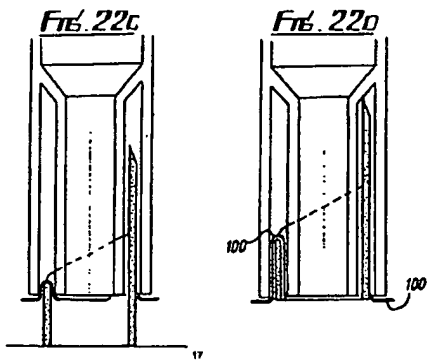
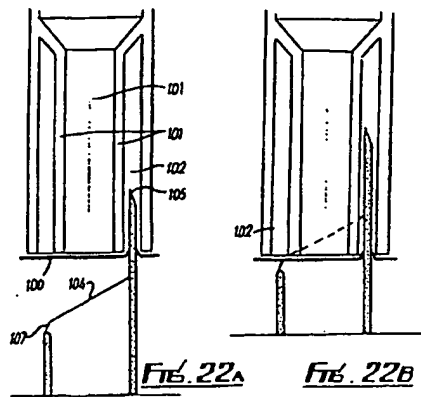
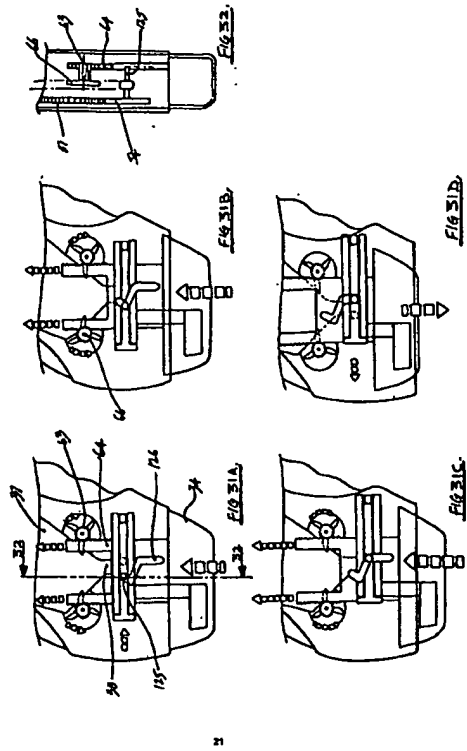
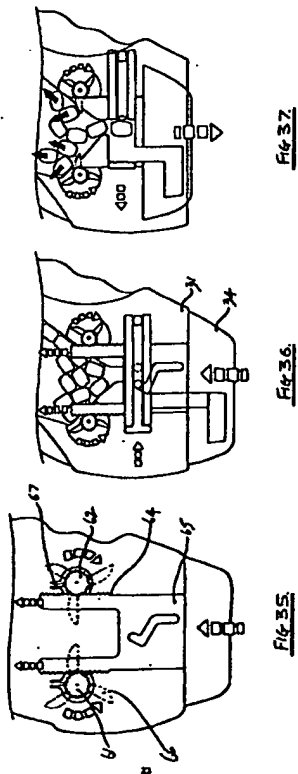


Fig. 21

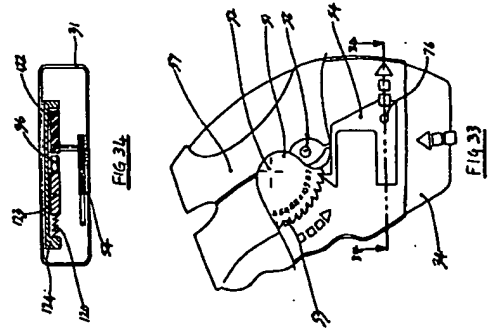




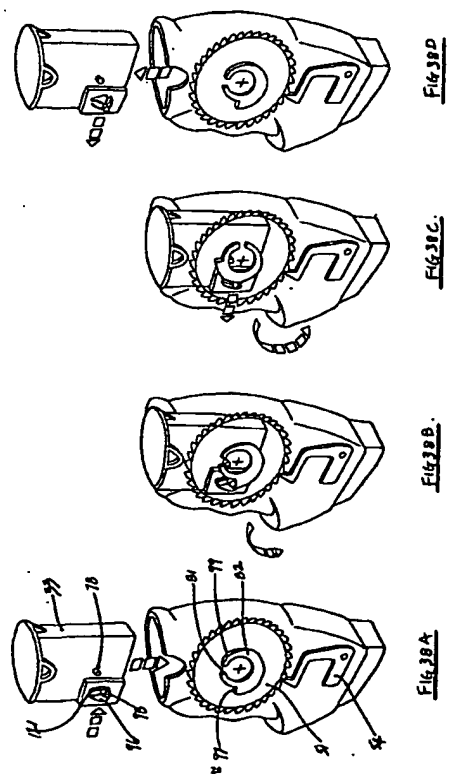
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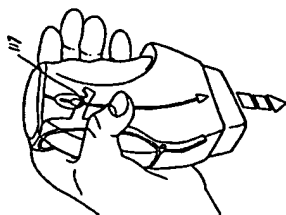


Fig. 40C



Fig. 40B



Fig. 40A

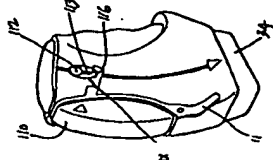


Fig. 39

European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 94 30 4228

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Character of documents with indication, where appropriate, of relevant passages	Relevant to claim	Classification of the documents (IPC Class)
A	FD-4-712 676 (ETABLISSEMENTS MYTTS FILIERES) * the whole document *	1	B650C3/04 A61J7/02
A	US-A-3 828 972 (LOUIS BENDER) * column 4, line 10 - column 6, line 61; figure 2 *	1	
A	GB-A-2 013 636 (THE SCOTTS COMPANY LIMITED)		
The present search report has been drawn up for all claims			
Name of inventor		Date of completion of the search	Searcher
BEKLIN		8 September 1994	Deparis, R
<p>CATEGORY OF CITED DOCUMENTS</p> <p>1: particularly relevant to the claims 2: particularly relevant to the claims 3: documents of the state of the art 4: documents of the state of the art 5: documents of the state of the art 6: documents of the state of the art 7: documents of the state of the art</p> <p>7: documents of the state of the art 8: documents of the state of the art 9: documents of the state of the art 10: documents of the state of the art 11: documents of the state of the art 12: documents of the state of the art 13: documents of the state of the art 14: documents of the state of the art 15: documents of the state of the art 16: documents of the state of the art 17: documents of the state of the art 18: documents of the state of the art 19: documents of the state of the art 20: documents of the state of the art 21: documents of the state of the art 22: documents of the state of the art 23: documents of the state of the art 24: documents of the state of the art 25: documents of the state of the art 26: documents of the state of the art 27: documents of the state of the art 28: documents of the state of the art 29: documents of the state of the art 30: documents of the state of the art 31: documents of the state of the art 32: documents of the state of the art 33: documents of the state of the art 34: documents of the state of the art 35: documents of the state of the art 36: documents of the state of the art 37: documents of the state of the art 38: documents of the state of the art 39: documents of the state of the art 40: documents of the state of the art 41: documents of the state of the art 42: documents of the state of the art 43: documents of the state of the art 44: documents of the state of the art 45: documents of the state of the art 46: documents of the state of the art 47: documents of the state of the art 48: documents of the state of the art 49: documents of the state of the art 50: documents of the state of the art 51: documents of the state of the art 52: documents of the state of the art 53: documents of the state of the art 54: documents of the state of the art 55: documents of the state of the art 56: documents of the state of the art 57: documents of the state of the art 58: documents of the state of the art 59: documents of the state of the art 60: documents of the state of the art 61: documents of the state of the art 62: documents of the state of the art 63: documents of the state of the art 64: documents of the state of the art 65: documents of the state of the art 66: documents of the state of the art 67: documents of the state of the art 68: documents of the state of the art 69: documents of the state of the art 70: documents of the state of the art 71: documents of the state of the art 72: documents of the state of the art 73: documents of the state of the art 74: documents of the state of the art 75: documents of the state of the art 76: documents of the state of the art 77: documents of the state of the art 78: documents of the state of the art 79: documents of the state of the art 80: documents of the state of the art 81: documents of the state of the art 82: documents of the state of the art 83: documents of the state of the art 84: documents of the state of the art 85: documents of the state of the art 86: documents of the state of the art 87: documents of the state of the art 88: documents of the state of the art 89: documents of the state of the art 90: documents of the state of the art 91: documents of the state of the art 92: documents of the state of the art 93: documents of the state of the art 94: documents of the state of the art 95: documents of the state of the art 96: documents of the state of the art 97: documents of the state of the art 98: documents of the state of the art 99: documents of the state of the art 100: documents of the state of the art</p>			